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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/741,122	12/19/2000	Ulf Mikael Ronstrom	43605-00023USPX	6406

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EXAMINER	
BRAGDON, REGINALD GLENWOOD	
ART UNIT	**PAPER NUMBER**
2188	

DATE MAILED: 02/11/2004 12

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/741,122	RONSTROM, ULF MIKAEL	
	Examiner	Art Unit	
	Reginald G. Bragdon	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 January 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings were received on 05 January 2004. These drawings are approved by the Examiner.

Claim Objections

2. Claims 11-14 are objected to because of the following informalities:

As per claim 11, line 13, --an-- should be added before "(i+1)-th".

All dependent claims are objected to as having the same deficiencies as the claims they depend from.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Christenson et al. (6,324,620), with support for the rejection of claims 3 and 17 provided by Miyazaki (6,385,697).

As per claims 1, 10, 15, and 25-26, Applicant's admitted prior art teaches a database system comprising a disc device D ("primary memory") which stores a plurality of data blocks organized as pages, where each page consists of one or more data objects. The database system also includes a main memory MM ("secondary memory device") connected to a processor PM. See figure 1-1 and page 2 of the specification. Within the main memory is a resident data memory section that includes a plurality of regions which store the pages (see page 7). Applicant's admitted prior art also teaches the storage of "hot", "warm", and "cold" pages, where the determination of whether a page is "hot", "warm" or "cold" is based on access frequency (i.e. the number of accesses in a unit time period).

Applicant's admitted prior art does not teach creating "data storage sections" within the resident data section for separately stores "hot" and "cold" pages. Christenson et al. teaches that it was known to create "hot" and "cold" partitions within a storage device for the storage of "hot" and "cold" data (based on access frequency). See column 3, lines 9-20, and column 9, lines 26-32. Christenson et al. also teaches the creation of partitions for storing average data (i.e. "warm" data). See column 9, lines 32-37. It would have been obvious to one of ordinary skill in the art to have modified Applicant's admitted prior art such that the resident data section is partitioned into "hot", "warm" and "cold" sections, as suggested by Christenson et al., because Christenson et al. teaches that this would relieve the memory bottleneck of a computer system and increase the speed of the system. See column 2, lines 35-37.

As per claims 2 and 16, Christenson et al. teaches "hot", "average" (i.e. warm), and "cold" regions of the memory device, which each regions having a predetermined access

frequency. See column 7, lines 13-25. As set forth above, Christenson et al. teaches moving data among the regions of data.

As per claims 3 and 17, the combination of Applicant's admitted prior art and Christenson et al. does not teach storing the access frequency with the data in the memory. However, it would have been obvious to one of ordinary skill in the art to stored the access frequency with the data in the memory because this would simplify the process of determining whether data should be moved from one "warmth" section to another "warmth" section. Storing access frequency information with the data in the memory is shown by Miyazaki, where access frequency information is stored with cache lines. See figure 5.

As per claims 4 and 19, the claim is rejected for the reasons set forth for claim 1, above, further noting that the access frequencies of the hot section ("(i+1)-th" data storage section") are greater than the access frequencies of the average (warm) section ("i-th" data storage section"). It is readily apparent that each "warmth" section contains an upper and lower threshold. Christenson et al. further teaches moving data between "warmth" sections based on the access frequency of a datum. See column 10, lines 35-37.

As per claims 5 and 20, Applicant's admitted prior art teaches that the main memory includes a page cache memory section ("first memory") and a resident data memory section ("second memory"). See figure 1-1. The transfer of data between "warmth" sections of the page cache memory section is taught as set forth above for claim 4.

As per claims 6 and 21, Applicant's admitted prior art teaches that the primary memory device is a disc device which stores a database, where the blocks on the disc consists of pages

comprised of objects of a plurality of bytes. The secondary memory device is a main memory of the processor PM, which includes a page cache section and a resident data section.

As per claims 7 and 22, Applicant's admitted prior art teaches that part of a database page or record may always reside in the resident data section and other parts of the page or record only reside in the page cache memory occasionally.

As per claims 8-9 and 23-24, Christenson et al. teaches thresholds for the partitioning and data movement. See column 6, lines 64-65.

As per claim 11, the claim is rejected for the reasons set forth above for claim 4, further noting that Applicant's admitted prior art teaches a hash table HT storing physical references. It would have been obvious to one of ordinary skill in the art to have updated the physical reference to an object in the hash table when the object was moved in order to prevent errors in accessing an object, thereby deteriorating the functioning of the system.

As per claim 12, the hash table is an index structure.

As per claims 13-14, Applicant's admitted prior art teaches that part of a database page or record may always reside in the resident data section and other parts of the page or record only reside in the page cache memory occasionally and can be easily moved. See page 7. As set forth for claim 11, the hash table must be updated when a part of page is moved in order to prevent errors in accessing an object.

As per claim 18, the claim is rejected for the reasons set forth above for claim 15, further noting that Applicant's admitted prior art teaches a hash table HT storing physical references. It would have been obvious to one of ordinary skill in the art to have updated the physical

reference to an object in the hash table when the object was moved in order to prevent errors in accessing an object, thereby deteriorating the functioning of the system.

Response to Arguments

5. Applicant's arguments filed 05 January 2004 have been fully considered but they are not persuasive.

Applicant argues on page 14 of the response that neither the Admitted prior art or Christenson et al. teaches "determining for each data object an access frequency". However, Christenson et al. teaches in column 9, lines 49-54, that "all the HOT data identified with respect to a DASD unit is moved to the HOT partition...and the identified COLD data is moved to the COLD partition". This indicates that each piece of data is checked to determine if the data is HOT or COLD (or AVERAGE).

Applicant argues, at the bottom of page 15 through the top of page 16, that motivation cited from Christenson et al. is not pertinent since Christenson et al. deals with memory bottlenecks relating to DASD devices and not primary or secondary memory. Although Christenson et al. may deal with DASD devices, the teaching is pertinent since it deals with transferring data within a storage or memory device based on access frequency.

It is not clear what is meant by Applicant's remarks in lines 3-4 of page 16 of the response ("for dealing with "particular data objections from either the Background or Christ [sic].").

Applicant's comments in the last paragraph on page 16 are not persuasive. The references are combined for the reasons set forth in claim 1. Other teachings relied upon are

either directly from the primary reference (Applicant's admitted prior art) or directly related to the subject matter from Christenson et al. that was combined previously.

With respect to Applicant's arguments concerning claims 3 and 17, a reference teaching the storage of access frequency information with its associated data has been provided.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any response to this final action should be mailed to:

Box AF
Commissioner of Patents and Trademarks
Washington, D.C. 20231

All "OFFICIAL" patent application related correspondence transmitted by FAX must be directed to the central FAX number at **(703) 872-9306**:

"INFORMAL" or "DRAFT" FAX communications may be sent to the Examiner at **(703) 746-5693**, only after approval by the Examiner.

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Fourth Floor (receptionist).

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Reginald G. Bragdon whose telephone number is (703) 305-3823. The examiner can normally be reached on Monday-Thursday from 7:00 AM to 4:30 PM and every other Friday from 7:00 AM to 3:30 PM.

The examiner's supervisor, Mano Padmanabhan, can be reached at (703) 306-2903.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

Reginald G. Bragdon
Primary Patent Examiner
Art Unit 2188

RGB
February 8, 2004